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prevent it from turning round, the carrier *k* will cause the upper stud *h* and the plate *ee*, together with the stud *i*, to be slid towards the left hand till the stud *i* comes in contact with the lower end of the carrier *k*; then the studs or drivers *h* and *i* will be acting with equal force against the ends of the carrier *k*, which will remove the greatest part of the twist or strain from the centre *c* of the chuck *aa*, by which means any slender cylinder, &c. may be turned more perfectly than can be done by a single driver. If another stud be screwed into one of the holes opposite the drivers *h* or *i*, it will prevent the thing to be turned from over-running itself, or backlashing when it has got a heavy side. The drivers *h* and *i* may be made of different lengths, as may be found most convenient.

No. XI.

TAPS FOR SCREW-NUTS.

The Thanks of the Society were voted to Mr. JAMES JONES, of Well Street, Wellclose Square, for his Communication respecting an Improvement made by him in tapping large Screw-Nuts; and the same was ordered to be printed in the Society's Transactions.

Well Street, Wellclose Square,
March 10, 1829.

SIR,

I BEG leave to submit to the Society of Arts, &c. an alteration in the construction of screw-taps, which, although small in itself, is of some practical utility, as it materially diminishes the labour requisite for tapping large nuts.

I am, Sir, &c. &c.

A. Aikin, Esq. J. Jones.
Secretary, &c. &c.

The ordinary form of taps for producing the spiral groove or thread, in nuts, is a circle of which four segments are filed off, leaving four smaller intermediate segments remaining; the parts corresponding to the chords of the deficient segments forming a very obtuse cutting edge, by which the superfluous metal in the nut is cut, or rather rubbed out. It is customary to use two taps,—a *taper*, or slightly conical one, with which the operation is commenced, and a *plug*, or parallel one, to equalise the hole and make the thread perfect.

The common tap requires to be worked into the nut by an alternate advancing and receding motion; the cutting being of so imperfect a kind that the power requisite to work the tap forward with continued advancing motion would be sufficient to wring the neck of the tap off, the resistance being greater than the strength of the metal will overcome.

The altered form, which I have adopted with very satisfactory result, is a combination of the taper and plug taps, the part towards the point being conical and the upper part cylindrical; and to prevent the necessity of drawing the tap out of the nut, the head of the tap is made less than the bottom of the thread, so that it drops through. The tap is fluted with four or more rectangular grooves, one side of which is in a line with the centre, thus giving, in a cross section of the tap, a form somewhat similar to a ratchet wheel. About one-third of the threads have their tops filed down to diminish the quantity of surface in contact, by which much labour is saved, as the greater part of the power requisite for screwing in the common way is expended in overcoming the friction, and not in cutting away the superfluous metal. This answers perfectly well for nuts not exceeding 1¼ inches ; but for larger ones, as 2 or 3 inches, I have found it advisable to insert a cutter in the body of the tap just at the part where the cone terminates, by which nearly the whole of the metal is cut out, and the upper or plug part of the tap has nothing to do but to equalise and smooth the thread. With this arrangement, I have had large nuts tapped at an expense not exceeding half the usual cost, for the operation is performed by a less number of hands, and more expeditiously, as the tap is inserted in the nut, and the men with the tap-wrench walk round it until the tap drops through, when the nut is complete, without the use of the plug tap.

In screwing large bolts I have experienced considerable advantage from clamping a cutter on the face of the die-stock, which (after the dies have got a good lead on the bolt) take out the metal very rapidly and with very little labour, the operation being merely the converse of the preceding.

These alterations or additions are in themselves small, but produce a very advantageous effect, as I have experienced in the manufacture of a large quantity of bolts and nuts which were screwed by the means here described.

J. JONES.

Reference to the Engraving. Plate XI.

Figs. 1, 2, and 3, *aa*, the die stock; *bb* the dies; *c* a boss perforated to receive the cutter *d; e* a screw to bind it tight; a movable clamp-piece *f* lays hold of the boss by its hooks *gg;* it contains the adjusting screw *h;* this may be removed, and the cutter also, or else drawn back while running the bolt through the dies to obtain sufficient lead; the cutter is then advanced to do the remainder of the work by the screw *h*. Sinking the die a little, as at *b*, fig. 4, holds the cutter more perfectly. To make the cutter, the tap is held in the dies; and when the cutter is nearly fitted, it is urged against the tap by the screw *h* and by the screw *e*, made to hold it moderately tight down, the tap turning round against it gives the perfect figure. The face is made flat, and the back filed or ground away to clear, just like a turning-tool. Fig. 5 shews a clamp for applying such a cutter to old stocks that are not otherwise provided with the means of holding it; *ii* dove-tailed gaps for holding a clamp-piece *f*.

Fig. 6, a tap; figs. 7 and 8, a section of it; *j k*, two cutters fitted in taper holes; they are formed while making the tap; the teeth are then flush with the tap thread, but are made to rise a little above by introducing a bit of writing-paper.

Figs. 9 and 10, sections of a larger tap, containing a cutter *b*, the body of which is parallel; fig. 11, portion of the tap, shewing the parallel cell into which the cutter is fitted; *m* a screw at the bottom of the cell to raise the cutter. I do not use movable cutters in taps below inch and quarter size, but in all cases reduce the tap into a series of cutters of the best form, having flat faces radiating from the centre; five flutes the whole length answer best, as shewn in figs. 6, 8, and 9, taking away full two-thirds of the circumference, one-third being sufficient for the spiral guidance: but this is not reduction enough, for, if four threads only were in the hole, there would be twenty cutters, and these would require twenty times the force which a man uses with a single turning-tool of similar size, and the cutters are less worn by making a decided cut than by mere scraping; I therefore remove half of these cutters along the middle of the tap; but as beginning the hole is easy, and the guidance and lead of the thread most wanted, I use the plain part *n* to make the tap begin to cut upright or straight with the hole, and leave the three or four first turns of the cutters *o* to form the lead and draw the tap in. I then remove every alternate cutter along the portion *p*, leaving the parallel portion *q* undisturbed. For tapping deep holes, two-thirds of the cutters may be removed with advantage. I sometimes use but one adjusting cutter; but two divides the labour, if one leaves the hole as the other is entering it.